Delaware Nonpoint Source Program

2017 Annual Report

DELAWARE DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL
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The Delaware Nonpoint Source Program administers a competitive grant made possible through Section 319 of the Clean Water Act. The grant provides funding for projects designed to reduce nonpoint source (NPS) pollution in Delaware. NPS pollution may be defined as any pollution that originates from a diffuse source (such as an open field or a road) and is transported to surface or ground waters through leaching or runoff. Reduction of NPS pollution may often be achieved through incorporation of specific best management practices (BMPs) into project workplans. Projects may target any source of NPS pollution, but most frequently involve agriculture, silviculture, construction, marinas, septic systems, and hydromodification activities.

In addition to funding projects that achieve reductions in NPS pollution, the Delaware NPS Program is committed to addressing the issue through educational programs, publications, and partnerships with other organizations working to reduce NPS pollution in Delaware.

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Published and Distributed by the:

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Final submitted to EPA: June 4, 2018

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Preface

The 2017 Delaware NPS Report is developed by the Delaware Department of Natural Resources and Environmental Control (DNREC) to meet a grant condition that appears in each annual 319(h) Grant award to the State of Delaware from the US Environmental Protection Agency. This programmatic condition in the award states, the report shall contain the following:

- A brief summary of progress in meeting the schedule of milestones in the approved Management Program, and,

- Reductions in nonpoint source pollutant loading and improvements in water quality that has resulted from implementation of the Management Program.

- Descriptions of priority Watershed Based Plan accomplishments. Accomplishments should be based on the implementation milestone goals/objectives as identified in each priority plan. The goal information can be displayed in the form of a watershed goal/accomplishment chart showing percent achieved, supplemented by a short narrative that should give the reader a clear understanding of the actions being taken and the outputs and outcomes which are occurring from the actions. If monitoring was completed, a summary of that information should also be included. For example, if 1000 feet of streambank stabilization was completed, then how does that compare to the needs identified in the watershed based plan i.e. what percent of streambank stabilization was completed compared to the overall needs as identified by the plan. Similar comparisons should also be provided for each significant pollutant load reduction

What is Nonpoint Source Pollution?

Nonpoint source (NPS) pollution is defined as polluted stormwater runoff associated with rainfall, snowmelt or irrigation water moving over and through the ground. As this water moves, it picks up and carries pollutants with it, such as sediments, nutrients, toxics, and pathogens. These pollutants eventually reach lakes, rivers, wetlands, coastal waters and ground waters of Delaware

NPS pollution is associated with a variety of activities on the land including farming, logging, urban/construction runoff, onsite sewage systems, streambank degradation, shore erosion and others. For example, stormwater flowing off the land carries the nutrients nitrogen and phosphorus into local streams, rivers and ponds. Under natural conditions, this is beneficial up to a point. However, if excessive nutrients enter these water bodies they cause nuisance algae blooms, then these nutrients are deemed pollutants.

The pollution contributed by nonpoint sources is the main reason why many of Delaware's waters are considered "impaired." Impaired waters are those waters that do not meet Water Quality Standards for designated uses (e.g., fishing, swimming, drinking water, shellfish harvesting, etc.). Progress in managing NPS pollution in Delaware is represented in this report.

It was produced by the Department of Natural Resources and Environmental Control (DNREC) – NPS Program to meet Clean Water Act, Section 319(h) Grant conditions and to demonstrate consistency with three essential elements:

1. EPA Strategic Plan Goal 2 – Protecting America's Waters
2. EPA Strategic Objective 2.2 – Protect and Restore Watersheds and Aquatic Ecosystems
3. Work plan commitments plus time frame (overall progress is reported in this document)

I. The Delaware NPS Program

As part of the DNREC, the Delaware NPS Program is committed to addressing the issue of nonpoint source pollution as it affects Delaware's numerous waterbodies. Efforts include grant funding, education, outreach, and partnerships with other organizations working together to reduce nonpoint source pollution in Delaware.

II. NPS Program Funding

Nonpoint Source (NPS) pollution constitutes the nation's largest source of water quality problems. Approximately 40 percent of the United States rivers, lakes, and estuaries surveyed to date are not clean enough to meet basic uses such as fishing or swimming, due to NPS pollution.

To counter the ever expanding NPS problem, Congress established the NPS Pollution Management Program under Section 319 of the Clean Water Act (CWA) in 1987. This program provides states with grants to implement NPS pollution controls to achieve goals that are described in NPS pollution management program plans.

On August 4, 1988, Delaware's original (NPS) Program was approved by the Environmental Protection Agency (EPA) making it one of the first programs in the nation to comply with Section 319 of the CWA. Delaware's current Nonpoint Source Management Plan was approved in September 2014. The 2014 NPS Management Plan is intended to be used as a guide by local, state and federal agencies as they develop projects and implement NPS reduction programs over the next five years. This 2014 NPS Management Plan outlines the NPS issues to be addressed and actions to be implemented over the planning period of 2014 through 2019 which are incorporated into the projects funded by Delaware's NPS Program using CWA Section 319 funding. The grant provides funding for projects designed to reduce NPS pollution in Delaware's impaired waterbodies. Reduction of NPS pollution is most often achieved through incorporation of specific best management practices (BMPs) into project workplans. Whenever possible, funds are focused in sub-watersheds where NPS control activities are likely to have the greatest positive impact. Funded restoration activities are implemented using the most effective measures and practices available in order to achieve water quality improvements. Eligible types of management program implementation activities include the following:

- Non-regulatory NPS reduction programs

- Technical assistance
- Financial assistance
- Education
- Training
- Technology transfer
- Demonstration projects

Proposals are requested annually, reviewed, evaluated and prioritized, and those which are determined to meet specified requirements are eligible for funding. At least 40 percent of the overall project cost must be represented by non-federal matching funds.

III. Delaware NPS Issues

More than 90 percent of Delaware's waterways are considered impaired. The state's list of impaired waters, filed with the EPA and approved August 2017, includes 377 bodies of water that suffer from 11 different impairments, the most common of which are NPS related pollutants including pathogens and nutrients (nitrogen and phosphorus). Most impairments come from nonpoint sources, which are harder to control. As Delaware is a groundwater driven state, removing NPS pollutants become an even harder problem to solve. Due to the rate of groundwater travel through the system, many NPS pollutants entering the systems up to 30 years ago are just now entering surface water bodies today. As such, the effectiveness of current agricultural BMPs will not be realized until much further in the future.

"Impaired waters" are polluted waters. More technically, they are waters that do not meet water-quality standards for their designated uses, such as recreation, fishing, or drinking. Impaired waters could be suffering from excess nutrients, low dissolved oxygen, toxins, bacteria, heat, or any combination of these problems.

Reduction of nonpoint sources of pollution is achieved through the incorporation or installation of specific best management practices (BMPs) addressing agriculture, silviculture, construction, septic systems, and hydromodification activities. To encourage and support the BMP installation, the NPS Program administers a competitive grant program currently made possible through Section 319 of the Clean Water Act. While this federal financial support has proven successful in complementing Delaware's NPS efforts, the NPS Program is currently seeking additional finances to expand our activities to more systematically address Delaware's NPS concerns.

Additional roles and responsibilities of the NPS Program include geospatial BMP tracking and reporting, management of the agricultural State Revolving Fund Program, support for developing Pollution Control Strategies, and watershed plan development and/or coordination.

IV. Vision and Mission

The Department of Natural Resources and Environmental Control envisions a Delaware that offers a healthy environment where people include a commitment to the protection, enhancement and enjoyment of the environment in their daily lives; where Delawareans' stewardship of natural resources ensures the sustainability of these resources for the appreciation and enjoyment of future generations; and where people recognize that a healthy environment and a strong economy support one another.

It's the mission of the Delaware Department of Natural Resources and Environmental Control to protect and manage the state's vital natural resources, protect public health and safety, provide quality outdoor recreation and to serve and educate the citizens of the First State about the wise use, conservation and enhancement of Delaware's Environment.

The Nonpoint Source Management Program is a dynamic and open-ended program intended to facilitate and promote statewide efforts to manage nonpoint source pollution. The following priorities will guide this program:

1. The NPS Program will support the identification and quantification of those problems that are caused specifically by nonpoint source pollution through assessment updates.
2. The NPS Program will be implemented and updated to realistically reduce nonpoint source pollution in a cost-effective manner.
3. The NPS Program will address nonpoint source pollution through a program that balances education, research, technical assistance, financial incentives, and regulation.
4. The NPS Program will follow a non-degradation policy in areas where surface and ground waters meet state water quality standards and a policy to realistically improve water quality in areas that do not meet these standards.
5. The NPS Program will continue to use the coordinated approach for implementation and maintain an open ended framework to incorporate new initiatives and support interactive approaches based on the effectiveness of existing policies and implementation mechanisms.

In Delaware, the lead agency for the development and implementation of the Nonpoint Source (NPS) 319 Program is the Department of Natural Resources and Environmental Control (DNREC), Division of Watershed Stewardship.

V. Executive Summary

The Delaware Nonpoint Source Program has focused this annual report on six priority watersheds in Delaware - Chesapeake, Christina Basin, Appoquinimink River, Broadkill River, Inland Bays, and St. Jones River - comprising 1,525 square miles. All suffer from impairments linked to nonpoint source water pollution.

In 2017, the Delaware NPS Program received $1.15M in federal section 319(h) grant funds to focus on nonpoint source water pollution reduction efforts. This annual report documents the activities and highlights of the State of Delaware, Department of Natural Resources and Environmental Control's (DNREC) Nonpoint Source (NPS) Program during the 2017 calendar year. It also fulfills the requirements of Section 319 of the federal Clean Water Act. DNREC's NPS Program annually prepares this report to inform stakeholders on the state's progress in the area of nonpoint source water pollution reduction. Although this report should not be considered a complete enumeration of all nonpoint source pollution reduction activities, it describes the most important features and accomplishments of the NPS Program.

In 2017, the Delaware NPS Program continued to reduce water pollutant levels by achieving milestone targets. Milestone targets are near-term or long-term commitments that promote a steady pace of progress towards water quality improvement. This report identifies several accomplishments during the 2017 calendar year that helped Delaware achieve long-term and short-term milestones (Appendix C), all of which have been identified in the State's NPS Management Program. In addition, this report contains water quality trends analysis for each priority watershed. These data are collected from water quality monitoring stations within each watershed and are expressed as positive (thumbs up), negative (thumbs down), or no trend (sideway thumb).

Milestone activities successfully implemented, by the Delaware NPS Program, in 2017 include: providing grant funding, education and outreach, and enhancing partnerships with other organizations to work together to reduce nonpoint source pollution in Delaware.

- **Grant funding** – In 2017, the Delaware NPS Program received $1.15M in federal section 319(h) grant funds to focus on nonpoint source pollution reduction efforts. Grant funding was used and leveraged to implement pollutant control projects, best management practices, and actions featured in the table below.

- **Education and Outreach** – Delaware again hosted the EPA R3 2017 Nonpoint Source Program Training and Meeting at the Atlantic Sands Hotel in Rehoboth Beach Delaware from October 24-26, 2017. The conference was well attended by over 100 attendees from federal, state, and local government, water resource engineers, water resource managers, environmental consultants, environmental policy managers, ecological scientists and researchers, hydrological modelers, students, and environmental interest groups.

- **Partnerships** – A highlight of 2017 for the Delaware NPS Program was the revitalization of partnerships. The Delaware CREP Program was established in 1999 with the designated goals of improving water quality and enhancing wildlife habitat in the coastal plain geographic areas of the Delaware, Chesapeake, and Inland Bays watersheds. The program is a partnership between USDA Farm Service Agency and DNREC (managed by the NPS Program). Delaware has continually faced challenges implementing new CREP practices, but fortunately, there was a resurgence of interest due to increased financial incentives provided by the State and USDA. The NPS Program has partnered with USDA FSA, USDA NRCS, US Fish & Wildlife Service, US Forest Service, Conservation Districts, and the Delaware Department of Agriculture to create a path forward to increase CREP practices. Because of this partnership, Delaware was awarded $1M in funding to increase incentives and implementation of buffers, within the Chesapeake Bay watershed, consistent with Delaware's Riparian Forest Buffer task force recommendations.

Overall, the NPS Program funded projects that were completed during the calendar year resulting in pollutant load reductions of nitrogen at 1,975,464 pounds/year and phosphorus at 53,166 pounds/year (see table page 24). These load reductions were accomplished from BMPs implemented in 2017 (see table below). Delaware continues to ensure that projects funded with CWA Section 319 dollars make progress towards restoring or protecting waters impaired by nonpoint source pollution.

2017 Annual BMP Progress

Pollutant Controls, Practices, and Actions	Unit	2017 Annual Progress
Cover Crop (traditional and commodity)	acres	77,924
Nutrient Relocation (net export from watershed)	tons	37,503
Nutrient Management	acres	308,571
Tree Planting	acres	31

VI. Watersheds

Chesapeake Bay

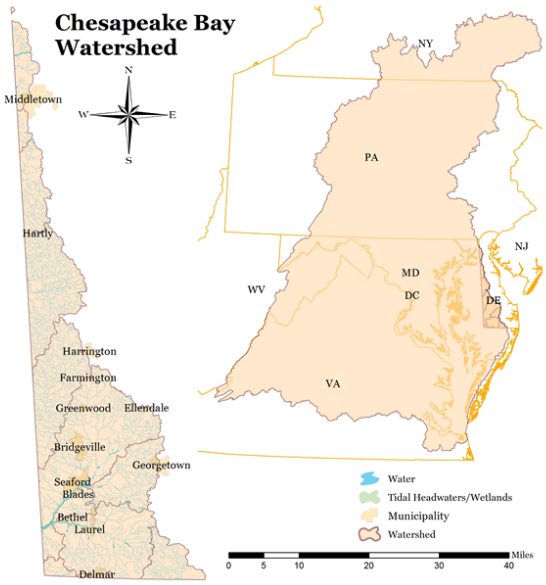
Delaware Nonpoint Source Program 2017 Watershed Progress Report

Chesapeake Bay Watershed

Watershed Description:

The Chesapeake Bay Watershed includes land area within Delaware, the District of Columbia, Maryland, New York, Pennsylvania, Virginia, and West Virginia. The portion of the Chesapeake Drainage within Delaware makes up about 1% of the land area within the entire Chesapeake Bay Watershed. The watersheds that make up the Chesapeake Drainage in Delaware encompass a 451,268 acre area of land in all three of Delaware's counties. The Chesapeake makes up approximately 10% of New Castle County, 33% of Kent County, and 50% of Sussex County.

The headwater streams and rivers that originate in Delaware all ultimately drain to the Eastern Shore of the Chesapeake. These streams include, from north to south: Elk Creek, Perch Creek, the C&D Canal, Bohemia Creek, Sassafras River, Chester River, Choptank River, Marshyhope Creek, Nanticoke River, Gum Branch, Gravelly Branch, Deep Creek, Broad Creek, Wicomico River, and Pocomoke River.



Water Quality Trends:

Total Phosphorus	Total Nitrogen	Total Suspended Solids

For more details see Appendix D at the end of the report.

BMP Progress FY 2017							
BMP Name	**Units**	**2017 Progress**	**Cumulative Progress**	**WIP Goal**	**% Achieved**	**Practice & N Load Reductions (lbs/year)**	**Practice & P Load Reductions (lbs/year)**
Cover Crop (traditional and commodity)	Acres	65,993	Annual	85,619	77%	909,629	2,597
Nutrient Relocation (net export from watershed)	Tons	12,180	Annual	110,757	11%	73,539	4,792
Nutrient Management	Acres	126,497	Annual	174,907	72%	327,296	23,112
Hardwood Tree Planting	Acres	424	985	930	46%	19,481	608
Water Control Structures	Acres	182	1,742	10,846	16%	13,009	0
Stream Restoration	Feet	0	9,621	63,202	15%	1,302	1,514
Wetland Restoration	Acres	32	2,756	5,725	48%	93,552	4,426
Cumulative Total Reductions						1,437,808	37,049

Delaware Nonpoint Source Program 2017 Watershed Progress Report

Chesapeake Bay Watershed

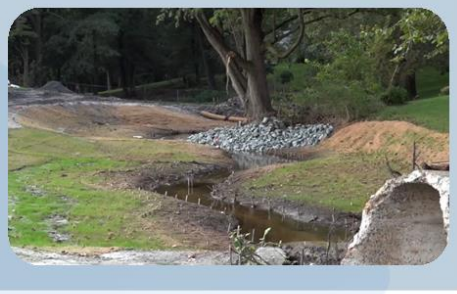
Goals: Current goals call for the increased implementation of numerous nonpoint source best management practices, especially in the agriculture sector (see below for a highlight of key numeric targets). The milestones allow jurisdictions the opportunity to adapt implementation strategies as necessary to meet the goals and achieve the TMDL standard. Delaware's milestone commitments are to annually reduce nitrogen by 3,429,386 pounds, phosphorus by 283,228 pounds and sediment by 60,605,240 pounds by the end of 2017, compared to the 2009 baseline.

Project Highlights:

Stella Ellis Stream Restoration Project in Laurel -

"The idea was to return the ditch to a channel with the overflow and stabilize it with native plants so it wouldn't wash out any more during high-rain events," said Travis Schirmer, DNREC, Division of Watershed Stewardship. What originated as a response to a drainage problem caused in part by a 90-degree bend in a ditch winding through a residential community evolved over time into a stream restoration that greatly reduced flooding in the area. Restoration work centered on rerouting overflow from heavy rainfall to nearby Records Pond. DNREC decided to take a natural channel design approach to solve the erosion problem. This approach features elements such as low flow channels and a floodplain to mimic nature's way of dissipating energy. The project has documented water quality benefits as it allows DNREC to balance the environmental needs of the Chesapeake Bay Watershed with the site specific concerns of the landowners. The project used native plants to create a wetlands buffer and also deployed rip-rap to stymie erosion at the base of trees along the stream.

Stella Ellis Stream Restoration Project



Reclaim Our River Program -

2018 marks the fifth year of the popular Reclaim Our River Program. This watershed wide outreach initiative has brought thousands of Delaware residents together to learn how they can improve and protect their waterways through a series of events including workshops and recreational activities. It has been designed to share important techniques for improving water quality by taking simple actions around the home and neighborhood. A variety of opportunities are available for family members of all ages. Activities range from rain barrel building and presentations on gardening for wildlife and water quality to competing in the Recycled Cardboard Boat Regatta - a fun way to connect residents to their local waterways and deliver important information on how to protect Delaware's aquatic resources.

Reclaim Our River - Recycled Cardboard Boat Regatta

St. Jones River

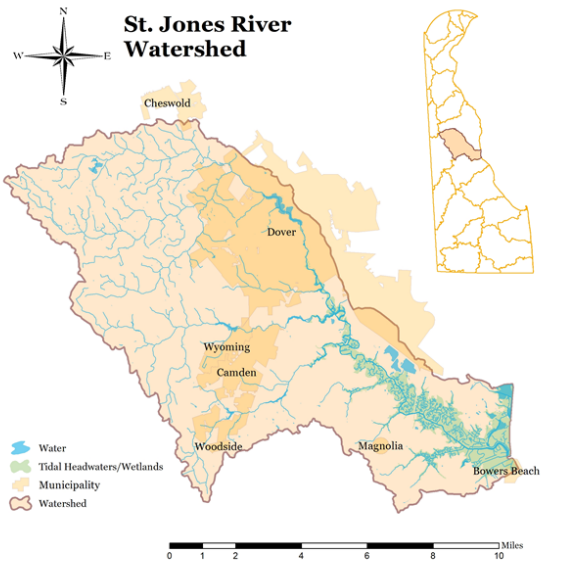
Delaware Nonpoint Source Program 2017 Watershed Progress Report

St. Jones River

Watershed Description:

The St. Jones River Watershed is approximately 25.9 square mile (16,576 acres) and is located in the central portion of Kent County. It drains 90 square miles of land. The major watercourse in the watershed is the St. Jones River which has its headwaters in the western part of the county, about 22 miles upstream from the Delaware Bay. Significant ponds in the watershed are Silver Lake, Moores Lake, and Wyoming Lake. Flat wetlands, usually forested, exist mostly in the upper portion of the watershed and eventually drain into creeks and streams. Nontidal riverine wetlands and tidal wetlands line the banks of the river, sometimes up to a $^1/_2$ mile wide toward the mouth of the river. Wetlands comprise 9,669 acres of the watershed and provide critical services such as nutrient removal, erosion control, habitat for plants and wildlife, flood reduction, and storm water storage to the citizens of Delaware.

The St. Jones Watershed has 5,236 acres of protected lands of which The St. Jones River Reserve protects approximately 3,750 acres.



Water Quality Trends:

Total Phosphorus	Total Nitrogen	Total Suspended Solids

For more details see Appendix D at the end of the report.

Project Highlight:

Goals: Limit pollutants to levels at or below the Total Maximum Daily Load (TMDL) values specified in the regulation, i.e., an overall reduction of nitrogen and phosphorus in the waterways by 40%, or 317,368 lbs per year for nitrogen and 23,141 pounds per year for phosphorus. Nonpoint sources, must reduce total nitrogen from 306,053 lbs per year and total phosphorus from 19,309 lbs per year. The TMDL also calls for 7,957 lbs per year reduction of nitrogen and 1,241 lbs per year from its stormwater (MS4) discharges. The designated uses for the St. Jones River include primary recreation, secondary recreation, fish, aquatic life and wildlife, industrial water supply, and agricultural water supply in freshwater

BMP Progress FY 2017							
BMP Name	**Units**	**2017 Progress**	**Cumulative Progress**	**WIP Goal**	**% Achieved**	**Practice & N Load Reductions (lbs/year)**	**Practice & P Load Reductions (lbs/year)**
Cover Crop (traditional	Acres	2,144	Annual	6,247	34%	6,572	7
Nutrient	Acres	9,309	Annual	21,588	43%	3,579	439
Total Reductions						10,151	446

Inland Bays

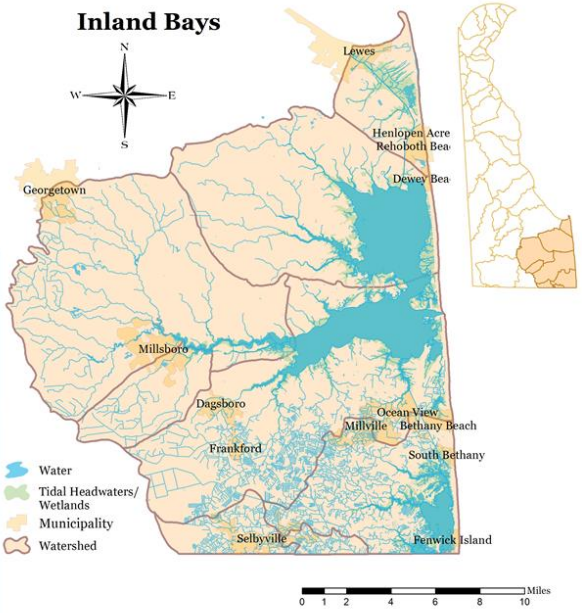
Delaware Nonpoint Source Program 2017 Watershed Progress Report

Inland Bays

Watershed Description:

The Inland Bays/Atlantic Ocean Basin comprises approximately 313 square miles of eastern Sussex County, Delaware. Starting at Lewes and Cape Henlopen State Park at the southern edge of the entrance to Delaware Bay, the area extends southward approximately 24 miles along the Atlantic shoreline to the Maryland State Line. It includes the coastal towns of Rehoboth Beach, Dewey Beach, Bethany Beach, South Bethany Beach, and Fenwick Island. State Route 1 (SR 1) extends parallel to the shoreline and connects the towns.

The three inland bays are located just landward of the Atlantic Ocean shoreline. From north to south, these are Rehoboth Bay, Indian River Bay, and Little Assawoman Bay. Rehoboth Bay contains the Lewes-Rehoboth Canal and Rehoboth Bay Watershed; the Indian River Bay contains the Indian River, Iron Branch, and Indian River Bay Watersheds; and the



Goals: Goals call for the increased implementation of numerous nonpoint source best management practices, especially in the agriculture sector to reduce Nitrogen by 508,445 lbs/yr and Phosporous by 22,630 lbs/yr. The goals are those that were presented by Inland Bays Pollution Control Strategies (PCS) and an approved EPA watershed plan. The PCS involves many strategies to reduce nitrogen and phosphorous to meet the TMDL, but what is presented here are initiatives of the 319 program.

Water Quality Trends:

Total Phosphorus	Total Nitrogen	Total Suspended Solids

For more details see Appendix D at the end of the report.

Project Highlights:

Forested buffers at Bullseye-Ferry Landing and Angola Neck Preserve -

The Center for the Inland Bays partnered with the Delaware Chapter of The Nature Conservancy (TNC) and the DNREC Division of Parks and Recreation implementing two projects to re-establish forest on parcels of land formerly used for row crops. Bare-root tree stock was installed at these sites using both a mechanical planter and volunteer labor. Twenty-two acres were planted at the TNC's Bullseye-Ferry Landing Preserve, a 557-acre easement on the Indian River. A total of 40 acres of fields have been reforested on the Perry Tract of the state-owned Angola Neck Preserve, located at the mouth of Love Creek, with 7.6 acres planted in 2017. Conversion of cropland to forested buffers is a particularly effective and efficient BMP to reduce nutrient inputs to Delaware's coastal bays. These projects will result in native, mixed hardwood /pine forest communities that create wildlife habitat and reduce nutrient pollution to nearby waterbodies.

Bullseye-Ferry Landing: 22 acres planted, TN reduction 352.0 ib/yr, TP 8.8 lb/yr
Angola Neck, Cherry Walk Ck buffer area: 1.0 acre, TN 42.0 lb/yr, TP 1.4 lb/yr
Angola Neck, other parcels: 7.6 acres, 121. 6 lb/yr, TP 3.0 lb/yr

Planting at the Bullseye-Ferry Landing Preserve. This 22 acre parcel was taken out of agricultural production and reforested with a

Inland Bays

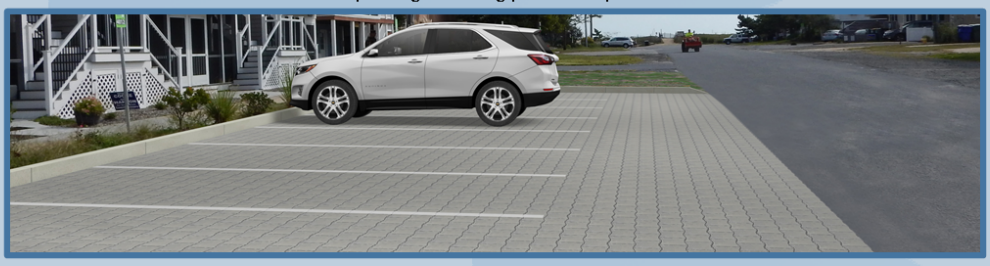
Project Highlights:

Town of *Dewey Beach Phase II Stormwater Planning* -

The Town of Dewey Beach's low elevation and high percentage of impervious cover makes it particularly vulnerable to the impacts of coastal storms and sea level rise. Shorelines are eroding, and many areas experience frequent flooding due to stormwater runoff, high bay tides, and storm surges. Untreated stormwater delivers nutrients and other pollutants directly to Rehoboth Bay.

Building upon an earlier planning effort, the Center for the Inland Bays partnered with the Town to develop a Phase II Stormwater Master Plan that provides specific recommendations for over 40 green infrastructure stormwater treatment and living shoreline practices, with cost estimates and concept designs. Policy and ordinance recommendations also are included. Each project in the plan will decrease runoff, reduce flooding, and improve water quality in the Bay.

Concept design showing permeable pavement



BMP Progress FY 2017							
BMP Name	Units	2017 Progress	Cumulative Progress	WIP Goal	% Achieved	Practice & N Load Reductions	Practice & P Load Reductions (lbs/
Cover Crop (traditional	Acres	15,211	Annual	37,637	40%	194,452	599
Nutrient Relocation (net	Tons	10,323	Annual	20,909	49%	57,803	4,062
Nutrient	Acres	7,235	Annual	53,827	13%	20,347	1,563
Riparian Buffer (forest	Acres	30.6	239.6	3,235	7%	10,066	335
Rain Garden	Structure	-	1	3	33%	-	-
Wetland Restoration	Acres	-	29	4,175	1%	913	47
Cumulative Total Reductions						283,581	6,606

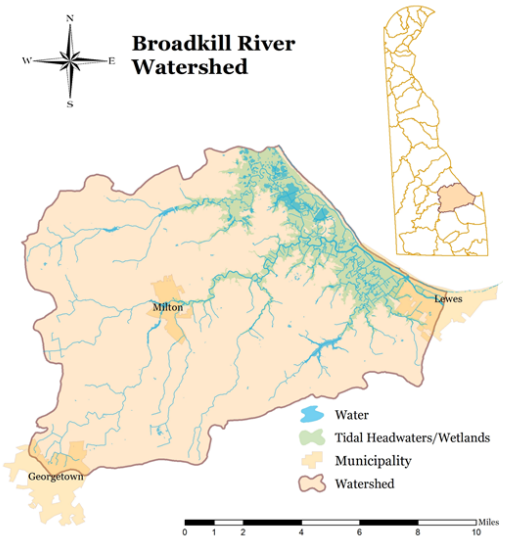
Broadkill River

Delaware Nonpoint Source Program 2017 Watershed Progress Report

Broadkill River

Watershed Description:

The Broadkill River Watershed is located in the east central portion of Sussex County. It is bounded on the north by the Cedar Creek Watershed, on the west by the Gravelly Branch and Deep Creek Watersheds, on the south by the Lewes-Rehoboth Canal, Rehoboth Bay, and Indian River Watersheds, and on the east by the Delaware Bay. The mainstem of the Broadkill River is approximately 25 miles long. The major watercourse in this segment is the Broadkill River which originates at the Town of Milton and discharges into the Roosevelt Inlet near Lewes. Major impoundments in the area are Waggamons and Diamond ponds located near Milton. The Broadkill River flows generally eastward until it approaches the coast where it turns abruptly and flows south to discharge into the Roosevelt Inlet. The flow of this stream is sluggish and the water is turbid. The watershed drains an area of 107 square miles.



Goals:

In terms of daily nonpoint source nutrient loads, the established Total Maximum Daily Load (TMDL) requires a 40% reduction in nitrogen (baseline 611,375 lbs/yr) and phosphorus (baseline 25,295 lbs/day) .

Water Quality Trends:

Total Phosphorus	Total Nitrogen	Total Suspended Solids

For more details see Appendix D at the end of the report.

BMP Progress FY 2017

BMP Name	Units	2017 Progress	Cumulative Progress	WIP Goal	% Achieved	Practice & N Load Reductions	Practice & P Load Reductions (lbs/
Cover Crop (traditional and commodity)	Acres	5,823	Annual	-	-	73,913	344
Nutrient Relocation (net export from watershed)	Tons	301	Annual	570	53%	1,674	61
Nutrient Management	Acres	65,711	Annual	79,420	83%	205,648	11,083
Hardwood Tree Planting	Acres	0	10.5	-	-	361	28
Rain Garden	Structure	0	5.4	-		-	-
Cumulative Total Reductions						281,596	11,516

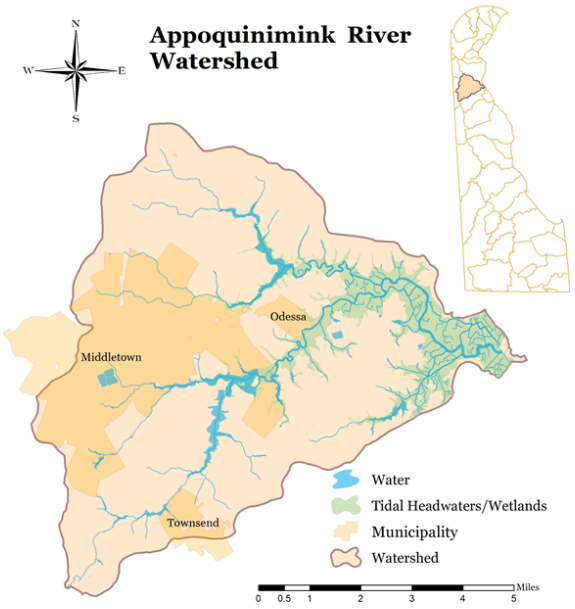
Appoquinimink River

Delaware Nonpoint Source Program 2017 Watershed Progress Report

Appoquinimink River

Watershed Description:

The 16-mile Appoquinimink River meanders through farmlands and wetlands in southern New Castle County, draining 47 square miles. The headwater drains mostly agricultural lands, and feeds four major ponds. The tidal freshwater segment of the Appoquinimink is bound by the head of tide at Noxontown Pond and Silver Lake, and by Drawyer Creek's confluence with the Appoquinimink. The remainder of the watershed consists of a tidal marsh extending to the Delaware River. The Appoquinimink River system consists of five main tributaries, the Appoquinimink River main stem, Deep Creek, Dove Nest, Hangman's Run, and Drawyer Creek. There are several shallow, man-made small lakes and ponds in the watershed: Wiggins Mill Pond, Noxontown Pond, Silver Lake, and Shallcross Lake. The Appoquinimink River is tidal from the confluence with Delaware Bay to the dam at Noxontown Lake on the main stem, the dam at Silver Lake on Deep Creek, and the confluence with Drawyer Creek. Salinity intrusion from Delaware Bay typically reaches upstream to river kilometer 8.5, past the Drawyer Creek confluence.



Goals:

Total Maximum Daily Loads (TMDLs) were established for the entire Appoquinimink River in December, 2003. These TMDLs called for 325,215 lbs/yr reduction in nonpoint nitrogen and 8,578 lbs/yr in phosphorus. An implementation plan, or a Pollution Control Strategy, was developed by a Tributary Action Team, a diverse group of citizens and government agency personnel and presented to the Department for promulgation to reach the prescribed TMDLs. Load reductions will be achieved through the implementation of BMP's in agriculture, development, wastewater, and private stewardship. The strategy is designed to reduce nutrient loadings from current and future land practices. This combination of actions will lead to the achievement of the TMDL.

Water Quality Trends:

Total Phosphorus	Total Nitrogen	Total Suspended Solids
		

For more details see Appendix D at the end of the report.

Progress Highlights:

All sectors have taken steps to improve water quality through the implementation of laws, regulations, and voluntary BMPs. Analysis using a basic land use loading rate model shows nonpoint sources of TN and TP have been reduced by 109% and 111%, respectively, from the TMDL baseline levels. There is still a need for further reductions in areas such as wastewater and stormwater.

BMP Progress FY 2017

BMP Name	Units	2017 Progress	Cumulative Progress	WIP Goal	% Achieved	Practice & N Load Reductions	Practice & P Load Reductions (lbs/
Cover Crop (traditional	Acres	-	Annual	3,145	-	-	-
Nutrient	Acres	20,257	Annual	12,854	157%	67,868	3,262
Riparian Buffer (forest	Acres	-	36	31.6	113%	-	-
Total Reductions						67,868	3,262

Christina Basin

Delaware Nonpoint Source Program 2017 Watershed Progress Report

Christina Basin

Watershed Description:

The Christina Basin is a 565 square mile basin contained in the larger Delaware River Basin. The Christina Basin, located in New Castle County in northern Delaware, includes four sub-watersheds:

- Brandywine Creek 325 sq. mi.
- Red Clay Creek 54 sq. mi.
- White Clay Creek 107 sq. mi.
- Christina River 78 sq. mi.

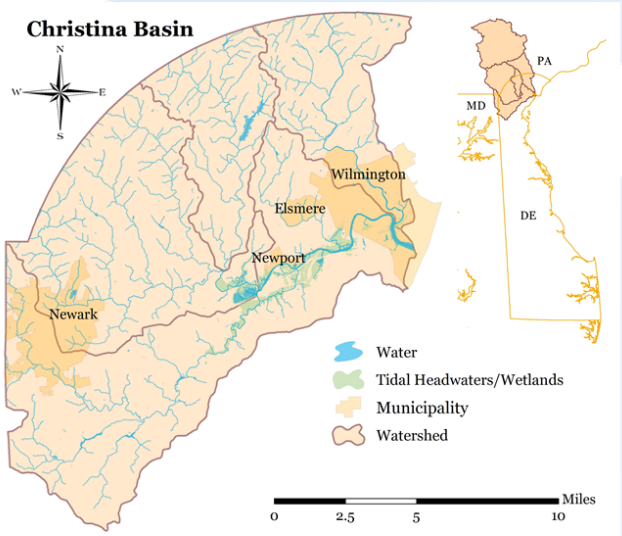
Although a small portion can be found within Maryland, the Christina Basin falls principally within two states, Pennsylvania to the north and Delaware to the south. The Pennsylvania portion is characterized by more open space, including agricultural land and forests, while the more urban, southerly portion in Delaware tends to have more built-up land.

The Watershed Implementation Plan development for the Christina Watershed was ap-

Water Quality

Total Phosphorus	
Total Nitrogen	
Total Suspended Solids	

For more details see Appendix D at the end of the report.



Goals: Reduce pollutant loadings from current and future land use practices with an effort to achieve the TMDL through the efforts of numerous organizations and individuals. Delaware's efforts will be coordinated with the ongoing pollution reduction efforts in the Pennsylvania portion of the Christina Basin. The level of pollution reductions necessary to achieve the designated uses in the streams of the Delaware portion of the Christina Basin vary significantly. Nitrogen levels need to be reduced by 39,460 lbs/yr, and phosphorus levels by 1,716 lbs/yr. In contrast, other areas of the Christina Basin are relatively free of excess nitrogen, phosphorus, and bacteria and simply need to be protected in their current state.

Partnership Efforts: ***Limestone Presbyterian Church Rain Garden*** **-** The 1600 sq. ft. rain garden at the Limestone Presbyterian Church uses parking lot islands to drain 2.6 acres of paved and upland areas in the White Clay Creek Watershed. In 2016, volunteers participated in on the ground training held by Red Tail Restoration & Land Management to learn about invasive species removal, maintenance of the rain garden and plant identification in the rain garden. Red Tail Restoration & Land Management spent 22 hours assisting volunteers with maintenance concerns including weeding, mulching, transplanting and pruning. Costs for 2016 paid by the Nonpoint Source Program totaled $300 with Suez Water paying an additional $710 towards this project.

Delaware Nonpoint Source Program 2017 Watershed Progress Report

Christina Basin

Project Highlights:

Finalization of Upper Christina Stream Restoration - Approximately 3,675 feet of stream was restored along the upper Christina River located west of Newark. These restoration efforts were implemented because of the severe bank erosion that was occurring along numerous properties adjacent to the stream channel. The banks were being undercut, causing mature trees to fall into the stream channel. Tremendous sediment loads were being released into the waterway with every storm event, impairing habitat and creating high turbidity conditions in the water column.

Restoration efforts along a tributary of the upper Christina River north of Hidden Valley Park which helped save a home that was being threatened by an eroding stream bank.

Before and after construction photos along the Upper Christina River as part of Phase I. Banks were stabilized with boulder walls and root wads (1b.). A cross-vane was installed (2b.) in the channel to prevent down-cutting and to direct the water toward the center of the channel during

Beginning in 2010, several property owners residing in the West Branch subdivision contacted the Division of Watershed Stewardship and expressed their concerns about the loss of trees and property with no apparent end in sight. They requested assistance to rectify the problems exacerbated by upstream development and increased amounts of impervious surface throughout the watershed. Another restoration request was received in 2011 by a State Representative on behalf of a property owner who was experiencing severe stream bank erosion which, if not addressed, posed a threat to the dwelling.

The before and after of stream restoration/shoreline stabilization work that was completed for Phase II of the Upper Christina River Stream

Implementation of the appropriate stream restoration techniques helped stabilize the stream banks, reducing sediment and nutrient loading, improving habitat and water quality, and allowing the channel to be resized for the flow volumes that pass through the systems during average storm events. Multiple restoration construction techniques, including bank-toe boulder protection and vegetative plantings were utilized to stabilize degraded stream banks and improve habitat and water quality and reduce the loss of property. Because of a lack of funding, no progress has taken place in 2017 for the Upper Christina Stream Restoration.

BMP Progress FY 2017

BMP Name	Units	2017 Progress	Cumulative Progress	WIP Goal	% Achieved	Practice & N Load Reductions (lbs/year)	Practice & P Load Reductions (lbs/year)
Cover Crop (traditional and commodity)	Acres	-	Annual	12.4	-	-	-
Nutrient Management	Acres	3,370	Annual	7,559.0	45%	11,291	543
Rain Garden	Structure	-	36	31.6	113%	-	-
Stream Restoration	Feet	-	3,675	0.0	-	-	-
Total Reductions						11,291	543

VII. Project Highlights

Stormwater Pond Retrofit

Delaware Nonpoint Source Program
2017 Watershed Progress Report

Stockley Pond Retrofit

Project Highlights:

The goal of this project is to improve water quality in Cow Bridge Branch, one of the Delaware Inland Bays' least disturbed tributaries, through a stormwater retrofit project on the Stockley campus (a residential facility for those with developmental disabilities) which sits on 750 acres of state-owned land a few miles south of Georgetown. The original inflow channel of the stormwater pond allowed runoff to bypass the pond, resulting in untreated stormwater entering the tributary of Cow Bridge Branch.

The project retrofitted the existing stormwater pond to a bioretention facility without an underdrain. Other improvements to the existing dry pond included stabilizing a failing slope, reconstructing a riprap inflow channel that allowed runoff to bypass the stormwater pond, and reconstruction of a forebay. The project complements previous restoration of a headwater stream upstream of the stormwater pond retrofit.

Pre-Construction

Outputs and Outcomes including Standard Metrics

- Reduction of 2.3 pounds/year of phosphorus, 17.1 pounds/ year of nitrogen, and 514.8 pounds/year of sediment to the stream and Inland Bays
- Demonstration of the potential of biortention ponds to decrease nutrient loads from stormwater runoff on State-owned properties, while improving the aesthetics of the stormwater facility
- Improved habitat for birds and wildlife

Post Construction

Nanticoke Tax Ditch Restoration

Delaware Nonpoint Source Program
2017 Watershed Progress Report

Nanticoke River Tax Ditch Restoration

Project Highlights:

The purpose of this project was to improve the natural habitat and water quality of a 4,342 linear feet stretch of the Nanticoke River Tax Ditch. Through this restoration, there will be reduced bank erosion, increased biodiversity of the stream bed, and restored the drainage capacity.

Natural buffer bank stabilization methods were used as well as a natural channel design. Through the efforts of this project, there will be more efficient drainage of the watershed and improve sediment transport.

Construction

Project Benefits:

- Reduction of maintenance costs
- Reduction of bank erosion estimated 380 tons/year
- Increased sediment transport
- Reestablishment of a riparian corridor with native plant material
- Improved water quality:
  Reductions in sediment
  Increased dissolved oxygen levels
  Decreased water temperatures
- Improved bed form diversity
- Improved habitat for birds and wildlife
- Improved wildlife and fisheries diversity

Post Construction

Envirothon

Delaware Nonpoint Source Program 2017 Watershed Progress Report

2017 Envirothon Training

What is the Envirothon?

The Delaware Envirothon Challenge is a fun way to engage local students and teachers with various environmental topics by holding interactive workshops hosted by experts or specialists in specific topics. The first Envirothon was held in 1996 and has made possible by collaborations between state, federal, and private agencies and organizations. Topics include aquatic ecology, forestry, soil/land use, air quality, and wildlife. Students can also be tested on their oral/public presentation skills and on a current special topic environmental issue that changes annually. Students are tested in teams on the presented topics after a hands-on educational training session. The winning team is sent to the NCF Envirothon to represent Delaware.

Envirothon Partnership

For 2017 Envirothon special topic was Agricultural Soil and Water Conservation Stewardship, which educated students about cropland management, soil health, agricultural-based nutrient inputs, waste management, and the relationship between water, soil, and farming. DNREC's Division of Watershed Stewardship Nonpoint Source Program partnered with the USDA NRCS to hold this event.

Participating student teams and chaperones listened to presentations on December 3, 2016 at Hickory Hill Farm (Dover, DE) and Dulin Brothers Farm (Clayton, DE) from DNREC and USDA representatives, specializing in agriculture and best management practices (BMPs) for reducing nutrient runoff and overall environmental impact.

Morning Session - Hickory Hill Farm

The morning agenda at Hickory Hill Farm featured presentations from DNREC and USDA's NRCS Program.

DNREC: "The Relationship of Agriculture, Water, and the Environment"

USDA: "Cropland Management," "Farmstead Best Management Practices and Pasture Management," "Soil Health/Conservation Planning," and "Calculating Soil Loss—RUSLE primer"

2017 Envirothon Winning Team

Wilmington Charter School Team B: (Left to right) Helen Xu, Catherine Yu, Allen Wang, Connor Sweeney, and Siddharth Grangrade.

Afternoon Session - Dulin Bros. Farm

In the afternoon, Samuel Dulin Jr. and his son, S. Lee Dulin III, welcomed the group to their family farm. Here, presenters had stations that students rotated through.

The Dulins: "Farm and Dairy Operations including BMP Upgrades"

USDA NRCS: "Roof Runoff Management (Keeping Water Clean)," "Storing and Handling Manure...," and "Cover Crops - Farming Smarter with Cover Crops."

USDA/DNREC : "Poultry Waste Storage Structure"

DNREC: "The Big Picture - The Interrelations of Ag and the Environment"

Urban Tree Planting

Delaware Nonpoint Source Program
2017 Watershed Progress Report

Urban and Community Forestry

Project Highlights:

The Nonpoint Source Program (NPS) has provided a pass through grant to the Urban and Community Forestry (U&CF) grant program to reach the goals of increasing canopy as well as address water quality in impaired watersheds throughout the state. NPS provided supplemental funding to the U&CF program to implement 7 tree planting projects to work toward achieving Delaware's Nonpoint Source Management Plan.

Town of Millville (Indian River Watershed): The Town planned was to install 9 trees at the new Millville Park location currently under construction (3 phases). This park was a residence and the property was donated to the Town. The trees planted in the park through this funding will provide shade for visitors, wildlife benefits, and increase tree canopy. The town has also passed a Tree Canopy Goal resolution focused on maintaining and increasing tree canopy in the town.

City of Lewes (Broadkill River Watershed): The City Lewes planted 6 trees along a main route into the City. The goal for these trees were to promote tree canopy and capture storm water runoff. The species of trees chosen are trees that will grow in the limited space that a historical city like Lewes as well as provide aesthetic appeal on this main thoroughfare.

City of Rehoboth Beach (Lewes-Rehoboth Canal Watershed): The City's plan was to plant 31 trees in a community that had the City's lowest tree canopy. The community was established in the 1970's and has not had little canopy cover since declining Bradford Pears were removed several years ago. Trees planted in this community will now help absorb over 3,000 gallons of storm water in their first year. The species chosen were species that will do well in an urban environment.

Town of Milton (Broadkill River Watershed): The Town's plan was to plant 17 trees in the downtown area. These trees were to be planted in an open space area that is used for the site of town festivals and activities. The open space location is also the site of flooding during large rain events. Species planted were appropriate for tolerating temporary water inundation and species that flowered for ascetic purpose and support pollinating insects.

Sterling Crossing Community (Lewes- Rehoboth Canal Watershed): This community's plan was to plant 26 trees. Primary goals for this community were to increase tree canopy and reduce heat island effects as their current tree canopy was at 1%.

City of Lewes

City of Rehoboth Beach

Town of Milton

Urban and Community Forestry

Town of Georgetown (Indian River Watershed):

Sterling Crossing Community

The Town of Georgetown's plan was to install 30 trees in three locations within the municipal limits. These trees were to be planted in areas to create a screen to above-ground infrastructure. The trees were to limit noise pollution and increase aesthetics to areas where above ground infrastructure is housed. Additionally trees were to be planted in a playground area to create shade and replace previously removed diseased trees that were in decline.

The Meadows at Old Landing Community (Rehoboth Bay):

This community planted 50 trees using community volunteers to plant each tree. The community's goal was to increase tree canopy, decrease water runoff and increase water quality. Species chosen for this tree planting were species that will be large at maturity and that would tolerate the compacted soils of the development.

VIII. Load Reductions

In 2017, the Delaware NPS Program load reductions were calculated for many of the 319 funded projects implemented on a watershed scale. The load reductions are calculated using guidance established during the Pollution Control Strategy development process.

2017 Project Load Reductions/Year by Watershed

Project	Nitrogen (lbs.)	Phosphorus (lbs.)
Chesapeake Bay	1,331,031	31,160
St. Jones River	10,151	446
Inland Bays	273,888	6,267
Broadkill River	281,235	11,488
Appoquinimink River	67,868	3,262
Christina	11,291	543
TOTAL	**1,975,464**	**53,166**

IX. Future Changes and Challenges

Delaware has developed this report to highlight accomplishments made in 2017 to reduce nitrogen, phosphorus, and sediment nonpoint source pollution. The charts and tables above signify the continued progress in reducing loads to impaired watersheds. Additional commitments were made, between DNREC and EPA, with the development of annual milestones identified in Delaware's 2015 NPS Management Plan. These milestones describe the outcomes and key actions expected each year. The NPS Management Plan includes objectives that address nonpoint sources of surface water and ground water pollution as appropriate (including sources of drinking water) in alignment with the goals of the Clean Water Act. Objectives of the plan include both implementation steps and how results will be tracked (e.g., water quality improvements or load reductions). Additionally, long-term goals and short-term milestones are integrated with other key environmental and natural resource programs. NPS's program goals and objectives are periodically revised to reflect progress or problems encountered, develop strategies to make progress towards achieving the goals, and develop indicators to measure progress. Updates to the NPS Milestones can be found in Appendix A.

Delaware continues to make progress to meet water quality goals with continued commitments of funding implementation activities to address the agriculture and urban sectors. For example, many of the key personnel working within the County Conservation District's help to write nutrient management plans, installing agriculture best management practices and helping farmers to identify resource concerns. Additional DNREC staff work with private landowners on buffers, wetland and stream restoration projects, septic system pump-outs, repair and/or replacement.

While we have missed some of our goals, Delaware has continued to make substantial progress and has invested significant effort into programmatic changes such as regulations, permits, and reorganizing programs. Although these additional efforts improve accountability, they do not have immediate input into nutrient reductions. Delaware's agricultural community works every day to conserve and protect our water resources, with many of our farmers implementing BMPs that are not accounted for or reported. We are now capturing some of the previously unreported BMP data through statewide driving surveys and Chesapeake Bay related verification efforts. Funding for cover crop cost-share programs has increased farmer participation and allowed us to increase cover crop BMP implementation acreages. In terms of regulations, in 2013, Delaware promulgated new On-Site Wastewater Regulations. The implementation of this new regulation is helping Delaware to meet future nutrient reduction goals for septic connections, pump-outs, and advanced treatment systems.

Delaware's NPS Program, since experiencing reorganization, has aligned the following programs - 319 NPS program, Chesapeake Bay Implementation Program, Conservation Reserve Enhancement Program and additional funding and resources through Delaware's Water Infrastructure Advisory Committee. The newly enhanced NPS Program has proven its efficiency by centralizing and reducing data reporting requirements while increasing grant funding availability and leveraging capacity for federal grants and expanding our partnerships.

Looking forward, Delaware's NPS Program will continue to make progress toward our goals and will work to align funding with water quality priorities. Although our state faces many challenges, we remain committed to working with our partners at the state, local, and federal levels to reduce the levels of nonpoint source pollution from entering our waterbodies.

X. List of Partner Organizations/Committee Members

The hard work and many hours of agency staff members, organization members and private individuals who have partnered with the NPS Program in 2017 to address, reduce, identify and/or measure NPS pollution in Delaware is greatly appreciated. This NPS pollution control and prevention program has been very active, well received and effective. It is a credit to our partners as they have cooperated in the face of many conflicts to make this program what it is today.

Name	Agency	Name	Agency
Absher, Debbie	Sussex Conservation District	Monteith, Tyler	NPS Program
Baldwin, Robert	Delaware Assoc of Conservation Districts	Palmer, Robert	Conservation Programs
Barthelmeh, Tom	Watershed Stewardship	Petrichenko, Paul	NRCS State Office
Bason, Chris	Center for the Inland Bays	Riley, Tim	Kent Conservation District
Biddle, Mark	Watershed Stewardship	Rutherford, Jamie	Sediment & Stormwater
Brosch, Chris	Delaware Nutrient Management Program	Saveikis, David	Fish&Wildlife
Brown, Lori	NPS Program	Schneider, John	Watershed Stewardship
Chaconas, Jim	Wetlands & Subaqueous Lands	Short, Austin	DE Department of Agriculture
Churchey, Dale	Delaware CREP Program	Short, Jim	Solid Waste
Cole, Kimberly	Delaware Coastal Program	Sturgis, Brittany	NPS Program
Coleman, Bob	Delaware Nutrient Management Program	Suffian, Fred	US EPA
Donnelly, Kevin	New Castle Conservation District	Sullivan, James	NPS Program
Esposito, Sara	DE Department of Transportation	Taylor, Kacey	USDA/NRCS
Foskey, Kip	Sussex Conservation District	Volk, Jenn	University of Delaware
Fox, Marcia	NPS Program	Walch, Marianne	Center for the Inland Bays
Garrahan, Tim	NRCS State Office	Watson, Jessica	Sussex Conservation District
Hogan, Mark	NPS Program	Webb, Sharon	NPS Program
Kauffman, Jerry	UD Water Resources Agency	Williams, Steve	Watershed Stewardship
Kepfer, Sally	NRCS State Office	Wilson, Bart	U.S. Fish and Wildlife Service
Lewandowski, Ed	University of Delaware	Wozniak, Sara	Watershed Stewardship
Manges, Lynn	Farm Service Agency	Zeiters, Brenda	NPS Program

Appendices

Appendix A – 2017 Milestones

Delaware NPS Program Short, Mid and Long Term Milestones		
Short and Mid Term Milestones (2015 – 2019)	**Deliverable**	**2017 Comments/Status Updates**
Establish baseline conditions for program indicators	Program indicator baseline	Efforts are currently underway to develop a compendium of Environmental Indicator (EI) data sets to communicate with the public. NPS staff has attended several EI meetings to discuss datasets that could be focused on for measuring the State's environmental conditions and status, and DNREC's performance. DNREC's Environmental Indicator initiative is now called The Environmental Perspectives Project. This new initiative will highlight agency's role in restoring, protecting, and enhancing the environment through data-driven storytelling. The purpose of the Project is to disseminate information to the public in a manner that is understandable and provides context for the purpose of the work DNREC does. "Reducing Nonpoint Source Pollution" will be a topic, in the future, for this Project.
Update Delaware's NPS Management Plan	Management Plan	Work with the NPS Advisory Committee to revise and update the 2014 NPS Management Plan. Plan will be reviewed in 2018 when Milestones are updated. A complete plan will be provided to EPA in 2019.
Complete approval of all existing watershed plans	Watershed plans	COMPLETED
Complete baseline sampling for initial priority watersheds	Priority watershed baseline	Establish baseline load reductions based on current monitoring data achieved in select Delaware watersheds to be determined as funding allows.

Estimated pollutant load reductions achieved for sediment, phosphorus and nitrogen from BMPs implementation in priority watersheds.	Increase annual load reductions as funding allows	Increase annual load reductions in non-Chesapeake Bay priority watersheds by 2% annually from the FY2015 baseline. Increase annual load reductions in Chesapeake Bay priority watersheds by 20% annually from the FY2015 baseline (to be determined as funding allows) for FY2015. Comparing 2016 to 2017 reduction loads, nitrogen load reductions increased in 2017 in the Inland Bays (44%), Broadkill River (82%), Appoquinimink River (30%), and Christina Basin (66%) watersheds. Phosphorus load reductions increased in 2017 in the Appoquinimink River watershed Inland Bays (54%), Broadkill River (86%), Appoquinimink River (69%), and Christina Basin (55%) watersheds. See Appendix B for charts (2015-2017).
Reduce nutrient loads from NPS sources in Delaware's priority watersheds.	Establish baseline load reductions from BMP implementation	Establish baseline of load reductions from BMP implementation in FY 2015 for the following priority watersheds: Inland Bays Little Assowoman Bay St. Jones River Appoquinimink River Christina River
Increase number of outreach and education interactions	Increase number of outreach and education interactions by 10% over FY 2015 baseline	This goal has been met through an outreach initiative relying on a variety of channels to deliver water quality messaging. These messaging outlets include the following but are not limited to printed/radio/TV advertising, events, workshops, presentations, programs, competitions, videos, webinar hosting's, websites, social media, email/newsletters, recreational opportunities and promotional materials.
Remove NPS related impairments from stream segments	one stream segment (2015) five stream segments (2019)	One stream segment will be identified annually as having improved water quality baseline assessment and will be included in the NPS annual success story. In 2015, one stream segment was removed. A total of five stream segments will be identified as having improved water quality baseline assessment by 2019.

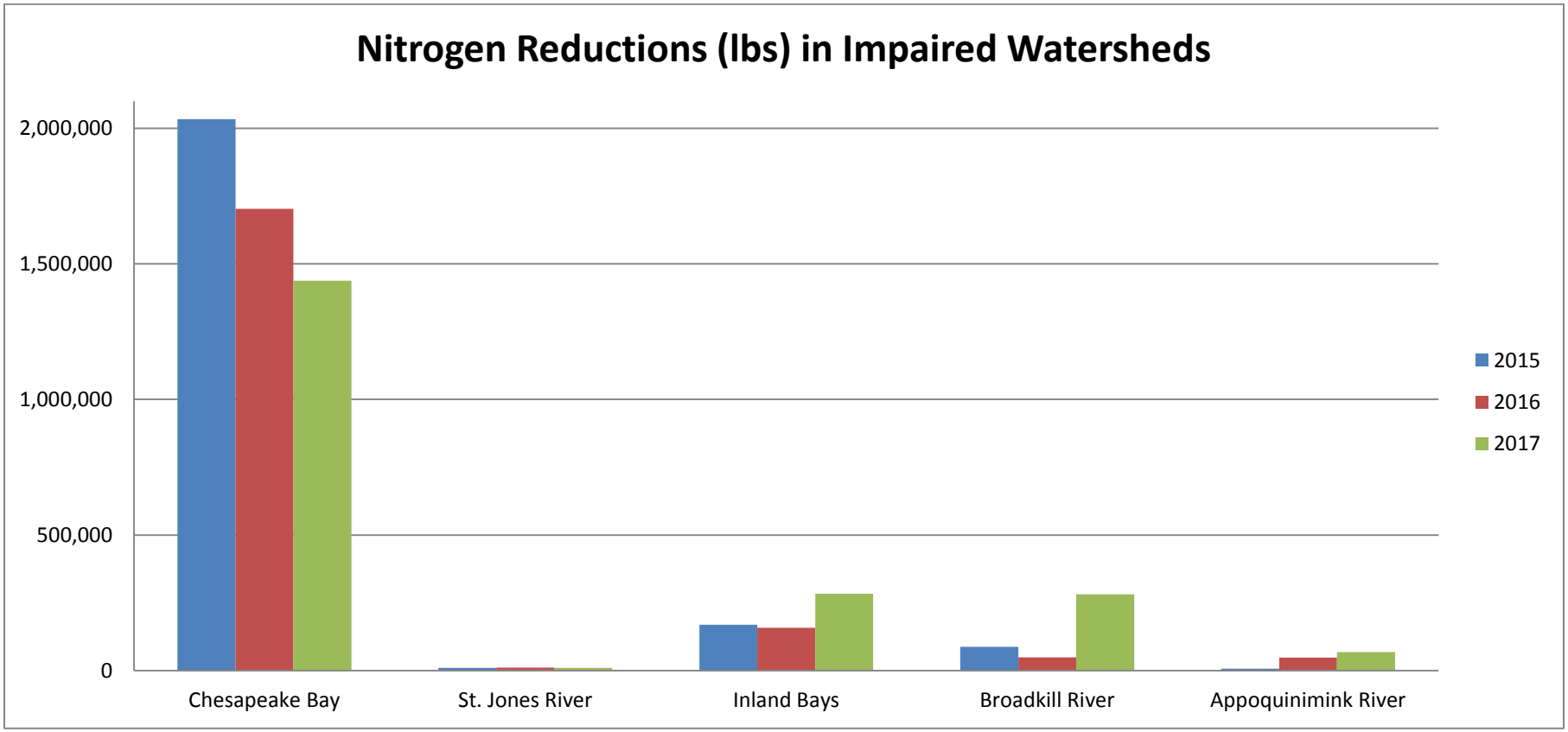
Assess interim and 2015 progress milestones	Biennial milestone updates	Assessment ongoing.
Show relative progress towards BMP implementation activities for all the EPA approved watershed plans	Increase BMP implementation annually by watershed	Progress ongoing.
Demonstrate water quality improvement in the priority watersheds resulting from plan implementation activities	303(d) de-listing	305(b) reports are prepared every even numbered year. Any water quality improvements would result in a 303(d) delisting. The 2016 combined watershed report for 305(b) and 303(d) was approved in August 2017. DNREC maintains delisting records at http://www.dnrec.delaware.gov/swc/wa/Documents/WAS/Updated%20305b%20and%20303d%20reports/Final%202016%20IR%20with%20appendices%208-28-17.pdf -
Show a 10% decrease of pollutant loadings in 50% or more of the priority watersheds	Annual load reduction decreases	Increase load reductions annually in non-Chesapeake Bay priority watersheds by 2% and by 20% in Chesapeake Bay priority watersheds from baseline. Nitrogen and Phosphorus Load reductions increased by at least 2% (between 2016 and 2017) in the following watersheds – Inland Bays, Broadkill River, Appoquinimink River, and Christina Basin. Phosphorus reductions increased in the St. Jones River; however, nitrogen increased. The Chesapeake Bay basin did not see reductions like the other basins.
Show annual increases in funding and quantities of BMPs implemented in priority watersheds	Procurement of funds to close BMP implementation gaps	NPS will seek alternative funding sources to assist with implementation of water quality BMPs.
Remove one stream segment per year from the 303(d) list through 2019	Removal of 303(d) stream segment	305(b) reports are prepared every even numbered year. Any water quality improvements would result in a 303(d) delisting. NPS will maintain delisting records and update annually. Significant delistings, as a result of NPS Program activities, will be highlighted in the annual NPS success story.

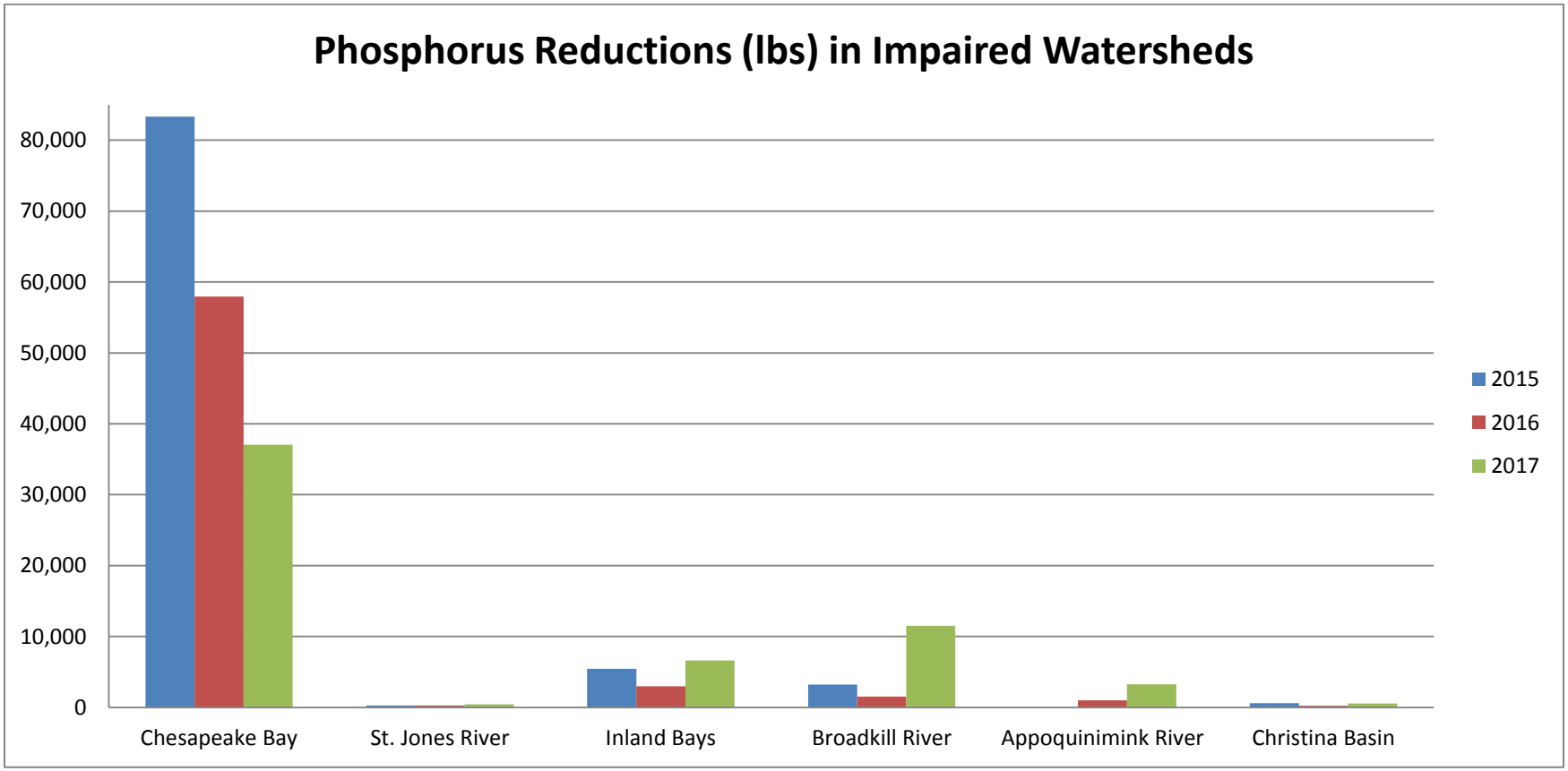
Long Term Milestones (2019-2030)	Deliverable	2015 Comments/Status Updates
Complete BMP implementation for 75% of the EPA approved watershed plans	Increase BMP implementation by 75%	Progress ongoing.
Remove 50% or more of high priority TMDLs from 2010 303(d) list	Removal of half of high priority TMDLs from 303(d) list	Progress ongoing.

Appendix B – Annual Nutrient reductions for N & P

Nitrogen Load Reductions (lbs./year)	Chesapeake	St. Jones River	Inland Bays	Broadkill River	Appoquinimink River	Christina Basin	Total N (lbs./year)
Cover Crops	909,629	6,572	194,452	73,913	-	-	1,184,566
Nutrient Relocation	73,539	-	57,803	1,674	-	-	133,016
Nutrient Management	327,296	3,579	20,347	205,648	67,868	11,291	624,738
Tree Planting	19,481	-	-	-	-	-	19,481
Riparian Buffer	-	-	1,286	-		-	1,286
Rain Gardens	-	-	-	-	-	-	-
Stream Restoration	-	-	-	-	-	-	-
Wetland Restoration	1,086	-	-	-	-	-	1,086
Total N Reductions	**1,331,031**	**10,151**	**273,888**	**281,235**	**67,868**	**11,291-**	**1,975,464**

Phosphorus Load Reductions (lbs./year)	Chesapeake	St. Jones River	Inland Bays	Broadkill River	Appoquinimink River	Christina Basin	Total P (lbs./year)
Cover Crops	2,597	7	599	344	-	-	3,547
Nutrient Relocation	4,792	-	4,062	61	-	-	8,915
Nutrient Management	23,112	439	1,563	11,083	3,262	543	39,459
Tree Planting	608	-	-	-	-	-	608
Riparian Buffer	-	-	43	-		-	43
Rain Gardens	-	-	-	-	-	-	-
Stream Restoration	-	-	-	-	-	-	-
Wetland Restoration	51	-	-	-	-	-	
Total P Reductions	**31,160**	**446**	**6,267**	**11,488**	**3,262**	**543**	**53,166**


Nitrogen Reductions (lbs) in Impaired Watersheds
2,000,000
1,500,000
1,000,000
500,000
0
Chesapeake Bay
St. Jones River
Inland Bays
Broadkill River
Appoquinimink River
2015
2016
2017


Phosphorus Reductions (lbs) in Impaired Watersheds
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
Chesapeake Bay
St. Jones River
Inland Bays
Broadkill River
Appoquinimink River
Christina Basin
2015
2016
2017

Appendix C – Annual Numeric Milestones

Pollutant Controls, Practices, and Actions (*annual, ǂcumulative)	Unit	2017 Progress	Chesapeake Bay	St. Jones River	Inland Bays	Broadkill River	Appoquinimink River	Christina Basin
Cover Crop* (traditional and commodity)	acres	75,798	65,993	2,144	15,,211	5,823	1,838	0
Nutrient Relocation* (net export from watershed)	tons	33,390	12,180	0	20,909	301	0	0
Nutrient Management*	acres	260,997	126,497	9,309	53,827	2,283	65,711	3,370
Tree Planting ǂ	acres	1,272	985	0	240	11	36	0
Wetland Restorationǂ	acres	2,785	2,756	0	29	0	0	0
Rain Gardenǂ	structure	42	0	0	1	5	0	36
Stream Restorationǂ	feet	13,296	9,621	0	0	0	0	3,675

Appendix D – Water Quality Trend Data

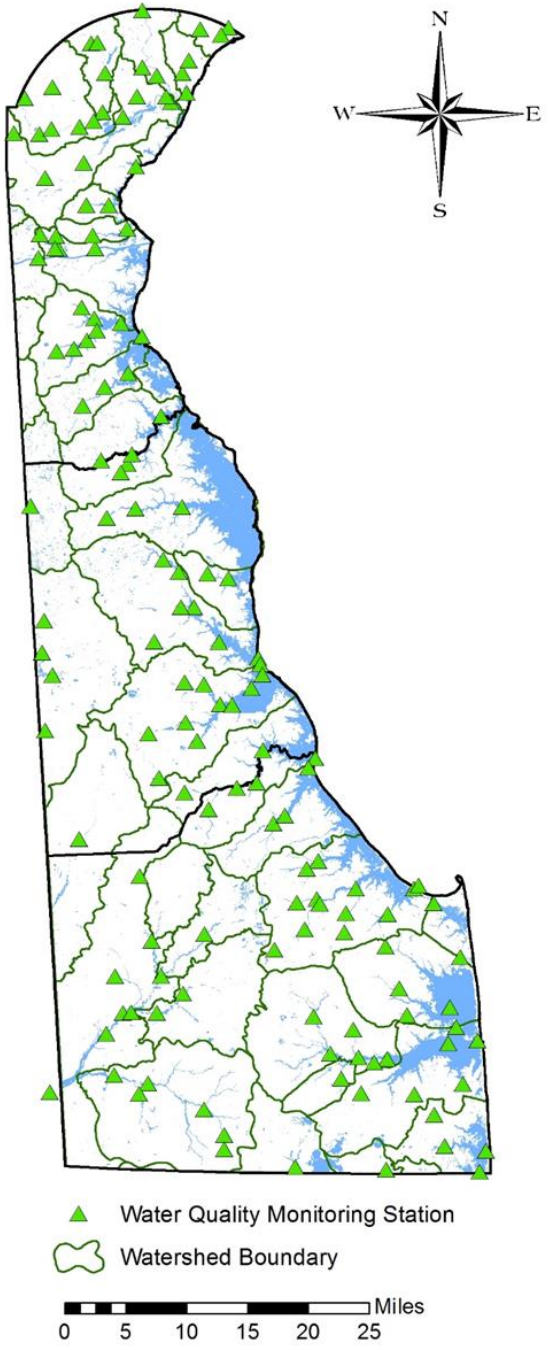
Total nitrogen and total phosphorus data from 1999-2017 for all Delaware STORET stations was retrieved. Data from stations with 40 or more data points were analyzed using WQSTAT software to evaluate for concentration trends using non-parametric methods. 133 stations had 40 or more data points for total phosphorus and 132 stations for total nitrogen. The software reported statistically significant trends at various confidence levels depending on the type of statistical test used. For regulatory purposes the Department would not ordinarily consider 80 or 90 percent confidence levels as a trigger for further action. For this analysis, however, the lower confidence results are reported and mapped to aid in "telling the story", especially in the mapped data. See the tables and maps below.

Of the 133 stations evaluated for total phosphorus concentration trends, 45 had statistically significant trends. Trends were closely divided between upward and downward trends. 88 stations showed no trend, either positive or negative. Of the 132 stations evaluated for total nitrogen concentration trends, 76 stations had statistically significant trends and 56 stations had no trend upward or downwards. The vast majority of significant trends for total nitrogen were downward trends, mostly at higher confidence levels.

140 Stations were analyzed for trends in measured concentrations of total suspended solids for the 1998-2014 period of record. Of those 140 stations, sixty one stations had statistically significant trends. Of the sixty one stations with trends, six stations had statistically significant upward trends and the remaining fifty five stations showed downward trends. Seventy nine stations did not have statistically significant trends either upward or downward.

Chesapeake Bay Non-tidal Monitoring

For 2018, Delaware DNREC is participating in a multi-State non-tidal monitoring Program conducted by the Chesapeake Bay Program and other jurisdictions including Maryland, Virginia, West Virginia, Pennsylvania, New York, and the District of Columbia. The Non-tidal Monitoring Network contains about 120 monitoring sites with the following two sites in Delaware:



1. Nanticoke River near Bridgeville

2. Marshyhope Creek at Fishers Bridge Rd

Monitoring at the sites is conducted monthly using sample collection protocol developed by the Chesapeake Bay Program Non-tidal monitoring workgroup (1). In addition to monthly sampling, 8 storm samples per year (2 per season) are collected at these sites.

Continuous Water Quality Monitoring

Delaware DNREC, in cooperation with the Delaware Geological Survey (DGS) and the United States Geological Survey (USGS), is maintaining a number of continuous Monitoring sites in the State. During FY 2018, six sites in Delaware are being monitored continuously. These sites include:

1. Brandywine Creek at Wilmington

2. Christina River at Newport

3. Appoquinimink River near Odessa

4. Millsboro Pond Outlet at Millsboro

5. Broadkill River near Milton

6. Massey Ditch at Massey Landing

Measurements of water temperature, dissolved oxygen (DO), pH, and specific conductance at these sites are conducted at every fifteen minutes interval by using multi-parameter water-quality data sondes (such as YSI sondes). All data are collected following USGS protocols and will be stored in USGS National Water Information System (NWIS) databases, **http://waterdata.usgs.gov/de/nwis/current/?type=quality**

Station	Watershed	Station Location	Total N count	Total N Trend	Total N Confidence	Total P Count	Total P trend	Total P Confidence	TSS Count	TSS Trend	TSS Confidence
101021	Naamans Creek	Naaman Creek @ State Line near Hickman Rd.	115	--	--	111	--	--	115	0.1322	98
101031	Naamans Creek	Naaman Creek S. Branch @ Darley Rd. (Rd. 207)	90	-0.052	98	90	--	--	90	-0.0851	95
101061	Naamans Creek	Naaman Creek South Branch @ Marsh Rd. (Rt. 3)	66	--	--	64	--	--	66	0	--
102041	Shellpot Creek	Shellpot Creek @ Hay Rd. (Rd. 501)	106	-0.052	98	104	--	--	106	-0.8908	95
102051	Shellpot Creek	Shellpot Creek @ Market St. (Rt. 13 Bus.)	95	--	--	93	--	--	95	0	--
102081	Shellpot Creek	Shellpot Creek @ Carr Rd.	64	-0.041	98	62	--	--	64	0	--
103011	Red Clay Creek	Stanton, Rt. 4 at Stanton Bridge (USGS gage 01480015)	115	--	--	114	-0.006	95	115	-0.1105	--
103031	Red Clay Creek	Red Clay Creek @ Lancaster Pike (Rt. 48)	142	--	--	141	-0.005	95	142	-0.0978	90
103041	Red Clay Creek	Red Clay Creek @ Barley Mill Rd. (Rd. 258A)	115	--	--	114	-0.010	95	115	-0.2505	98
103061	Red Clay Creek	Burroughs Run @ Creek Rd. (Rt. 82)	115	-0.017	90	114	--	--	116	-0.1187	98
104011	Brandywine Creek	Brandywine Creek @ Foot Bridge in Brandywine Park	114	--	--	113	-0.002	90	114	-0.0694	--
104021	Brandywine Creek	Brandywine Creek @ New Bridge Rd. (Rd. 279)	143	-0.019	95	142	--	--	143	0	--
104051	Brandywine Creek	Brandywine Creek @ Smith Bridge Rd. (Rd. 221)	113	--	--	111	--	--	113	-0.2003	95
105031	White Clay Creek	White Clay Creek @ Chambers Rock Rd. (Rd.	114	--	--	113	-0.005	95	115	-0.3199	98

Station	Watershed	Station Location	Total N count	Total N Trend	Total N Confidence	Total P Count	Total P trend	Total P Confidence	TSS Count	TSS Trend	TSS Confidence
		329)									
105151	White Clay Creek	White Clay Creek @ Delaware Park Blvd.	144	--	--	142	-0.002	90	144	-0.0949	--
105171	White Clay Creek	White Clay Creek @ McKees Lane	96	--	--	94	--	--	96	-0.2606	--
106021	Christina River	Christina River beneath Rt. 141 Bridge	105	-0.046	95	105	--	--	105	-0.5993	95
106031	Christina River	Smalleys Dam Spillway @ Smalleys Dam Rd.	108	--	--	106	--	--	108	-0.1913	--
106141	Christina River	Christina River @ Sunset Lake Rd. (Rt. 72)	135	-0.046	98	132	--	--	135	-0.3515	98
106191	Christina River	Christina River @ Nottingham Rd. (Rt. 273)	108	--	--	103	--	--	108	0	--
106281	Christina River	Little Mill Creek @ DuPont Rd.	108	-0.049	95	104	--	--	108	-0.2813	98
106291	Christina River	Christina River near Conrail Bridge	124	-0.030	95	124	-0.001	90	124	-0.3691	--
107011	Red Lion Creek	Red Lion Creek @ Bear Corbitt Rd. (Rt. 7)	105	-0.027	98	104	--	--	105	-0.1792	98
107031	Red Lion Creek	Red Lion Creek @ Rt. 9	103	--	--	102	0.004	95	103	-0.5605	--
108021	Chesapeake & Delaware Canal	C & D Canal @ DuPont Pkwy. (Rt. 13) N. side	102	--	--	101	--	--	102	0.5151	--
108111	Chesapeake & Delaware Canal	Lums Pond @ Boat Ramp	97	-0.023	95	108	--	--	--	--	--
109041	Appoquinimink River	Appoquinimink River @ DuPont Pkwy. (Rt. 13)	101	-0.051	95	103	--	--	104	-0.1259	--
109071	Appoquinimink River	Drawyer Creek off Rt. 13 @ parking area	103	-0.047	95	103	--	--	104	-0.8321	--

Station	Watershed	Station Location	Total N count	Total N Trend	Total N Confidence	Total P Count	Total P trend	Total P Confidence	TSS Count	TSS Trend	TSS Confidence
109091	Appoquinimink River	Appoquinimink River @ Mouth	104	-0.022	95	103	--	--	104	0.111	--
109121	Appoquinimink River	Appoquinimink River @ Silver Run Rd. (Rt. 9) NE	103	-0.026	95	102	-0.002	80	103	-1.217	95
109131	Appoquinimink River	Noxontown Pond @ Noxontown Rd. (Rd. 38)	96	-0.020	90	102	-0.001	90	104	-0.1677	--
109171	Appoquinimink River	Appoquinimink River @ MOT Gut (west bank)	94	-0.022	95	95	--	--	96	-0.1207	--
109191	Appoquinimink River	Shallcross Lake @ Shallcross Lake Rd. (Rd. 428)	103	-0.073	95	101	--	--	103	0	--
109251	Appoquinimink River	Deep Creek Branch @ Summit Bridge Rd. (Rt. 71)	86	-0.222	98	84	--	--	85	0	--
110011	Appoquinimink River	Blackbird Creek @ Blackbird Station Rd. (Rd. 463)	95	-0.028	90	97	--	--	98	0	--
110031	Lower Blackbird	Blackbird Creek @ Blackbird Landing Rd. (Rd. 455)	60	--	--	66	0.005	90	66	-0.4215	--
110041	Lower Blackbird	Blackbird Creek @ Taylors Bridge Rd. (Rt. 9)	101	-0.040	95	99	--	--	101	-0.8024	--
111011	Dragon Run Creek	Dragon Creek @ Wrangle Hill Rd. (Rt. 9)	91	--	--	104	0.003	95	--	--	--
111031	Dragon Run Creek	Dragon Creek @ S. DuPont Hwy. (Rt. 13)	99	-0.041	95	98	--	--	--	--	--
112021	Chesapeake Drainage System	Sewell Branch @ Sewell Branch Rd. (Rd. 95)	97	-0.062	95	102	--	--	101	0	--
114011	Army Creek	Army Creek @ River Rd. (Rt. 9)	97	-0.059	98	98	0.003	90	99	1.282	98

Station	Watershed	Station Location	Total N count	Total N Trend	Total N Confidence	Total P Count	Total P trend	Total P Confidence	TSS Count	TSS Trend	TSS Confidence
201011	Smyrna River	Mill Creek (Lake Como outfall) @ Rt. 13	57	--	--	68	--	--	68	-0.6384	95
201021	Smyrna River	Mill Creek @ Carter Rd. (Rd. 137)	96	-0.048	95	101	--	--	103	0	--
201041	Smyrna River	Smyrna River @ Flemings Landing (Rt. 9)	104	-0.028	95	102	--	--	104	-2.199	90
201051	Smyrna River	DucK Creek @ Smyrna Landing Rd. (Rd. 485)	96	--	--	102	--	--	104	0.348	--
201161	Smyrna River	Providence Creek @ Duck Creek Rd. (Rt. 15)	99	--	--	94	--	--	99	-0.2022	95
202021	Leipsic River	Garrisons Lake @ DuPont Hwy. (Rt. 13)	87	-0.027	80	102	--	--	--	--	--
202031	Leipsic River	Leipsic River @ Denny St. (Rt. 9)	102	-0.033	95	102	--	--	--	--	--
202191	Leipsic River	Leipsic River @ Mt. Friendship Rd. (Rt. 15)	60	-0.095	98	62	-0.004	90	62	-0.2735	--
204031	Little River	Little River @ Bayside Dr. (Rt. 9)	104	-0.043	98	103	--	--	104	0.7003	--
204041	Little River	Little River @ N. Little Creek Rd. (Rt. 8)	105	--	--	104	--	--	105	-0.2628	--
205011	Saint Jones River	St. Jones River @ mouth, Bowers Beach	79	-0.076	98	80	--	--	82	-0.5981	--
205041	Saint Jones River	St. Jones River @ Barkers Landing	105	-0.025	95	104	--	--	101	-2.113	95
205091	Saint Jones River	St. Jones River @ East Lebanon Rd. (Rt. 10)	100	-0.067	95	101	--	--	101	-1.491	98
205151	Saint Jones River	Fork Branch @ State College Rd. (Rd. 69)	92	-0.021	90	99	-0.003	80	99	-0.2912	98
205181	Saint Jones River	Moores Lake @ S. State St. (Rd. 27)	100	--	--	101	0.001	95	101	-0.126	--

Station	Watershed	Station Location	Total N count	Total N Trend	Total N Confidence	Total P Count	Total P trend	Total P Confidence	TSS Count	TSS Trend	TSS Confidence
205191	Saint Jones River	Silver Lake @ Spillway (Dover City Park)	104	--	--	128	0.001	80	129	-0.1408	--
205211	Saint Jones River	Derby Pond @ Boat Ramp (Rt. 13A)	94	--	--	99	0.001	95	99	0	--
206011	Murderkill River	Murderkill River @ Rt. 13	168	--	--	165	--	--	168	-0.1614	95
206041	Murderkill River	Browns Branch @ Milford-Harrington Hwy. (Rt. 14)	138	-0.219	98	136	--	--	138	-0.2408	98
206091	Murderkill River	Murderkill River @ Bay Rd. (Rt. 1/113)	134	-0.028	80	132	-0.005	95	134	-1.705	95
206101	Murderkill River	Murderkill River @ Bowers Beach Wharf (mouth)	148	-0.020	80	153	--	--	153	-2.484	95
206141	Murderkill River	Murderkill River near levee @ MNWA (RM 3.25)	124	--	--	123	-0.007	98	124	-1.906	95
206231	Murderkill River	Murderkill Rv. @ confl. of KCWWTF discharge ditch	123	-0.038	90	121	-0.006	80	123	-1.594	95
206361	Murderkill River	McColley Pond @ Canterbury Rd. (Rt. 15)	138	--	--	136	0.001	95	138	0	--
206451	Murderkill River	Coursey Pond @ Canterbury Rd. (Rt. 15)	129	0.031	80	134	--	--	136	-0.4087	95
206561	Murderkill River	Double Run @ Barratts Chapel Rd. (Rd. 371)	135	-0.080	95	134	0.002	90	135	0.4632	80
207021	Choptank	Cow Marsh Creek @ Mahan Corner Rd. (Rd. 208)	99	--	--	99	0.001	90	99	0	--
207081	Choptank	Tappahanna Ditch @ Sandy Bend Rd. (Rd. 222)	98	-0.020	80	101	0.002	80	101	0	--
207091	Choptank	Culbreth Marsh Ditch @ Shady Bridge Rd. (Rd. 210)	102	0.031	95	102	--	--	102	-0.0905	--

Station	Watershed	Station Location	Total N count	Total N Trend	Total N Confidence	Total P Count	Total P trend	Total P Confidence	TSS Count	TSS Trend	TSS Confidence
207111	Choptank	White Marsh Br. @ Cedar Grove Church Rd. (Rd. 268)	100	0.100	98	100	--	--	100	-0.0412	80
208021	Mispillion River	Mispillion River @ Rt. 1	107	--	--	106	-0.171	80	107	-1.134	95
208061	Mispillion River	Mispillion River @ Cedar Creek confluence	103	-0.036	95	110	--	--	110	-1.485	80
208181	Mispillion River	Abbotts Pond @ Abbotts Pond Rd. (Rd. 620)	109	--	--	104	--	--	108	0	--
208211	Mispillion River	Silver Lake @ Maple Ave.	108	--	--	107	--	--	109	-0.3279	95
208231	Mispillion River	Beaverdam Branch @ Deep Grass Ln. (Rd. 384)	110	0.053	98	106	--	--	109	-0.237	95
301021	Cedar Creek	Swiggetts Pond @ Cedar Creek Rd. (Rt. 30)	108	0.031	80	104	--	--	107	-0.1727	95
301031	Cedar Creek	Cedar Creek @ Coastal Hwy. (Rt. 1)	110	--	--	109	0.004	95	109	0.3437	--
301091	Cedar Creek	Cedar Creek @ Cedar Beach Rd. (Rt. 36)	108	-0.031	95	106	--	--	109	-0.8542	--
302031	Marshyhope Creek	Marshyhope Creek @ Fishers Bridge Rd. (Rd. 308)	185	--	--	185	--	--	186	0	--
303011	Broadkill River	Savannah Ditch @ Savannah Drive (Rd. 246)	103	-0.416	90	102	--	--	102	0	--
303021	Broadkill River	Ingram Branch @ Gravel Hill Rd. (Rd. 248)	104	0.154	80	103	0.015	95	--	--	--
303031	Broadkill River	Broadkill River @ Union St (Rt. 5)	136	-0.063	95	133	--	--	135	0	--
303041	Broadkill River	Broadkill River @ Rt. 1 Bridge	104	-0.058	95	103	0.002	80	103	-0.792	--

Station	Watershed	Station Location	Total N count	Total N Trend	Total N Confidence	Total P Count	Total P trend	Total P Confidence	TSS Count	TSS Trend	TSS Confidence
303051	Broadkill River	Red Mill Pond @ Rt. 1	96	--	--	103	-0.003	95	103	-0.7305	95
303061	Broadkill River	Broadkill River 0.10 Miles From Mouth	81	--	--	85	--	--	87	0	--
303171	Broadkill River	Beaverdam Creek @ Cave Neck Rd. (Rd. 88)	105	--	--	103	-0.003	95	104	0	--
303181	Broadkill River	Beaverdam Creek @ Carpenter Rd. (Rd. 259)	103	-0.266	98	100	-0.010	95	102	-0.3657	98
303311	Broadkill River	Round Pole Branch @ Cave Neck Rd. (Rd. 88)	103	0.044	80	101	--	--	102	0	--
303331	Broadkill River	Waples Pond @ Rt. 1	105	--	--	101	--	--	104	0	--
303341	Broadkill River	Pemberton Branch @ Gravel Hill Rd. (Rt. 30)	104	0.051	98	99	--	--	103	-0.2019	95
304011	Nanticoke River	Nanticoke River @ Sharptown	94	--	--	93	--	--	95	0	--
304151	Nanticoke River	Nanticoke River @ Buoy 66 (mouth of DuPont Gut)	97	-0.038	95	95	--	--	97	-0.216	--
304191	Nanticoke River	Nanticoke River @ Rifle Range Rd. (Rd. 545)	183	--	--	181	--	--	183	-0.1827	98
304311	Nanticoke River	Concord Pond @ German Rd. (Rd. 516)	104	--	--	101	--	--	104	0	--
304321	Nanticoke River	Williams Pond @ East Poplar St.	101	-0.063	80	100	--	--	102	0	--
304381	Nanticoke River	Bucks Branch @ Conrail Rd. (Rd. 546)	91	--	--	90	--	--	91	0	--
304471	Nanticoke River	Nanticoke River @ Rt. 13	102	--	--	100	--	--	102	0.2111	--
304591	Nanticoke River	Deep Creek @ Old Furnace Rd. (Rd. 46)				43	-0.007	90	43	1.162	98

Station	Watershed	Station Location	Total N count	Total N Trend	Total N Confidence	Total P Count	Total P trend	Total P Confidence	TSS Count	TSS Trend	TSS Confidence
304681	Nanticoke River	Nanticoke River @ Beach Hwy. (Rt. 16)	49	--	--	49	--	--	49	-0.2804	--
305011	Lewes and Rehoboth Canal	Lewes & Rehoboth Canal @ Rt. 1	105	--	--	104	--	--	106	-0.8797	98
305041	Lewes and Rehoboth Canal	Lewes & Rehoboth Canal @ Rt. 9	104	--	--	104	--	--	106	-0.6095	95
306091	Rehoboth Bay	Rehoboth Bay @ Buoy 7	80	-0.015	98	95	--	--	97	-0.8721	98
306111	Rehoboth Bay	Massey Ditch @ Buoy 17	87	--	--	104	0.001	90	106	-0.9137	98
306121	Indian River	Indian River Bay @ Buoy 20	102	--	--	116	0.002	95	119	-0.8166	95
306181	Indian River	Indian River @ Buoy 49 (Swan Creek)	95	-0.054	95	95	--	--	97	0.3747	--
306321	Indian River	Indian River Inlet @ Coast Guard Station	114	-0.016	98	123	--	--	125	-0.2767	--
306331	Indian River	Indian River @ Island Creek	96	-0.032	95	94	--	--	96	-0.6217	80
306341	Indian River	Island Creek upper third	95	--	--	93	--	--	95	-0.6645	80
307011	Broad Creek	Records Pond @ Willow Street	103	-0.045	95	101	0.001	90	103	0	--
307031	Broad Creek	Broad Creek @ Bethel Rd. (Rd. 493)	47	0.157	80	47	0.005	95	47	2.607	95
307081	Broad Creek	Hitch Pond Branch @ Pepper Pond Rd. (Rd. 449)	44	--	--	49	--	--	49	0.2381	--
307171	Broad Creek	Horsey Pond @ Sharptown Rd. (Rt. 24)	98	-0.076	90	98	--	--	100	0	--
307371	Broad Creek	Raccoon Prong @	62	--	--	66	--	--	65	0	--

Station	Watershed	Station Location	Total N count	Total N Trend	Total N Confidence	Total P Count	Total P trend	Total P Confidence	TSS Count	TSS Trend	TSS Confidence
		Pepperbox Rd. (Rd. 66)									
308031	Rehoboth Bay	Burton Pond @ John Williams Hwy. (Rt. 24)	104	--	--	104	--	--	107	0	--
308051	Rehoboth Bay	Guinea Creek @ Banks Rd. (Rd. 298)	107	-0.104	95	104	0.001	80	107	-0.2523	80
308071	Indian River	Millsboro Pond @ John Williams Hwy. (Rt. 24)	143	-0.067	95	141	0.001	98	143	0.06214	90
308091	Indian River	Pepper Creek @ Main St. (Rt. 26)	109	-0.050	95	107	0.001	95	109	0.1428	--
308281	Indian River	Cow Bridge Branch @ Zoar Rd. (Rd. 48)	103	-0.076	95	107	0.001	90	108	0	--
308341	Indian River	Swan Creek @ Mount Joy Rd. (Rd. 297)	103	--	--	96	--	--	103	0	--
308361	Indian River	Blackwater Creek @ Omar Rd. (Rd. 54)	97	-0.133	95	97	--	--	99	-0.099	--
308371	Rehoboth Bay	Bundicks Branch @ Beaver Dam Rd. (Rt. 23)	94	0.212	95	94	--	--	94	-0.1164	80
309041	Iron Branch	Whartons Branch @ Dagsboro Rd. (Rt. 20)	107	-0.106	95	106	-0.001	95	107	-0.4364	95
310011	Little Assawoman Bay	Little Assawoman Bay @ Rt. 54 (The Ditch)	94	-0.023	95	106	--	--	109	-0.8528	95
310031	Little Assawoman Bay	Dirickson Creek @ Old Mill Bridge Rd. (Rd. 381)	100	-0.068	95	105	--	--	107	-0.9807	95
310071	Little Assawoman Bay	Little Assawoman Bay Mid-Bay (Ocean Park Lane)	98	-0.049	95	105	-0.002	95	108	-1.281	95
310121	Little Assawoman Bay	Beaver Dam Ditch @ Beaver Dam Rd. (Rd. 368)	124	-0.143	95	121	0.001	90	124	-0.1183	80

Station	Watershed	Station Location	Total N count	Total N Trend	Total N Confidence	Total P Count	Total P trend	Total P Confidence	TSS Count	TSS Trend	TSS Confidence
311041	Buntings Branch	Buntings Branch @ Fenwick Rd. (Rt. 54)	99	--	--	99	--	--	100	0	--
312011	Indian River	White Creek @ mouth of Assawoman Canal	103	-0.041	98	106	-0.002	95	108	-1.398	95
313011	Pocomoke River	Pocomoke River @ Bethel Rd. (Rd. 419)	97	--	--	101	--	--	101	0	--
316011	Nanticoke River	Gravelly Branch @ Coverdale Rd. (Rd. 525)	106	--	--	101	--	--	106	0	--
316031	Nanticoke River	Gravelly Branch @ Deer Forest Rd. (Rd. 565)	53	-0.036	80	53	--	--	53	-0.0384	--
401011	Delaware Bay	Roosevelt Inlet Mouth	99	--	--	109	--	--	--	--	--

2017
Delaware Nonpoint Source Program
Delaware Department of Natural Resources and Environmental Control